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ABSTRACT

Since Hall and Sandler's original work on the chilly classroom climate for women, which was published in 1982 by the Project on the Status and Education of Women of the Association of American Colleges, there has been much controversy and debate about its existence. Critics point out that the original work was nothing more than a literature review, no data were collected, and much of the information presented was anecdotal in nature. Proponents of the existence of the chilly climate maintain that women are, in fact, treated differently from men both in and out of the classroom, and this differential treatment negatively impacts their performance in college. Over the past 20 years, empirical research on the chilly climate for women has yielded conflicting results. While some authors have focused exclusively on the classroom environment, others have included the campus environment as well. This review of literature on the chilly climate for women includes a historical overview of the major reports and studies that substantiate its existence as well as data that refute it, and the various tools that have been used for measuring chilly climate. (Contains 20 references.) (Author/SM)

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The Chilly Climate for Women: A Literature Review

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Abstract

Since Hall and Sandler's original work on the chilly classroom climate for women, which was published in 1982 by the Project on the Status and Education of Women of the Association of American Colleges, there has been much controversy and debate about its existence. Critics point out that the original work was nothing more than a literature review, no data were collected, and much of the information presented was anecdotal in nature. Proponents of the existence of the chilly climate maintain that women are, in fact, treated differently from men both in and out of the classroom, and this differential treatment negatively impacts their performance in college. Over the past twenty years, empirical research on the chilly climate for women has yielded conflicting results. While some authors have focused exclusively on the classroom environment, others have included the campus environment as well. This review of literature on the chilly climate for women includes a historical overview of the major reports and studies, data that substantiate its existence as well as data that refute it, and the various tools that have been used for measuring chilly climate.

The Chilly Climate for Women: A Literature Review

This review of literature will include a historical overview of the literature on the chilly climate for women, research in support of the chilly climate, and the evidence against it. Only research conducted with the stated purpose of studying the chilly climate for women will be included. The literature review will conclude with recommendations for future research.

Historical Overview

The original report on the chilly climate, entitled *The Classroom Climate: A Chilly One for Women?,* was written by Hall and Sandler in 1982 and published by the Project on the Status and Education of Women of the Association of American Colleges. According to Hall and Sandler's report, some faculty treat women differently from men in the classroom, often inadvertently. Women may either be singled out or ignored because of their gender, which leads to a loss of confidence in their abilities and puts them at an educational disadvantage.

As noted by Hall and Sandler (1982), overt examples of the chilly climate include discouraging women's participation in class; preventing women from seeking help outside of class; causing women to drop classes or switch majors; making disparaging comments about women; disparaging women's intellectual abilities; implying that women lack commitment; making comments about women's physical attributes or appearance; disparaging women's professional accomplishments; referring to males as "men" and females as "girls"; making sexist jokes; ridiculing scholarship that deals with women's perceptions and feelings; and making direct sexual overtures to women.

Less obvious expressions of the chilly climate include making eye contact with men more often than with women; nodding and gesturing more often in response to men's comments; using a patronizing or impatient tone with women; appearing more attentive, such as by leaning forward,

when male students speak, but not when female students speak; habitually standing closer to males when lecturing; giving men detailed instructions on an assignment, but doing the assignment for women, which implies they are incapable; calling on men more than women; calling male students by name more often than female students; waiting longer for men than for women to answer a question; interrupting women students or allowing them to be interrupted by peers more often than men; asking women lower order factual questions and men higher order questions that require critical thinking; using classroom examples that reflect stereotyped roles such as referring to a doctor as "he" and a secretary as "she"; using the generic "he" to represent both men and women (Hall & Sandler, 1982).

After the release of the Hall and Sandler report, which was essentially a review of the literature, there was much controversy about the existence of the chilly climate. Critics of Hall and Sandler's original work (e.g., Heller, Puff, & Mills, 1985) accurately pointed out that no data were collected and much of the information presented was anecdotal in nature.

In 1984, Hall and Sandler expanded the concept of the chilly climate to include the campus in their report, *Out of the Classroom: A Chilly Campus Climate for Women?* According to this report, the campus environment was defined as including interactions with other students and staff, and students' experiences with support services such as admissions, financial aid, academic advising and career counseling, lab and field work, campus employment, internships, health care, campus safety, dormitory life, athletics, and student government and leadership, all of which may potentially contribute to a less than accepting campus climate. The authors also suggested that certain groups of women (e.g., minorities, older women, and disabled women) may especially be affected by a chilly campus climate.

In the 1980s and early 1990s, The Program for the Status and Education of Women of the Association of American Colleges and Universities published a series of reports on the chilly climate, which is available today as the "Chilly Climate Series" (Association of American Colleges and Universities, 2003). The series includes: *The Classroom Climate: A Chilly One for Women?* (Hall & Sandler, 1982); *Academic Mentoring for Women Students and Faculty: A New Look at an Old Way to Get Ahead* (Hall & Sandler, 1983); *Out of the Classroom: A Chilly Campus Climate for Women?* (Hall & Sandler, 1984); *Selected Activities Using "The Classroom Climate: A Chilly One for Women"* (Johnson & Hall, 1984); *The Campus Climate Revisited: Chilly for Women Faculty, Administrators, and Graduate Students* (Sandler & Hall, 1986); *Rx for Success: Improving the Climate for Women in Medical Schools and Teaching Hospitals* (Ehrhart & Sandler, 1990); *Success and Survival Strategies for Women Faculty Members* (Sandler, 1992); and *Teaching Faculty Members to be Better Teachers: A Guide to Equitable and Effective Classroom Techniques* (Sandler & Hoffman, 1992). A more extensive work, *The Chilly Classroom Climate: A Guide to Improve the Education of Women* (Sandler, Silverberg, & Hall, 1996), was published by the National Association for Women in Education. In Canada, the University of Western Ontario's Caucus on Women's Issues produced a video, *The Chilly Climate for Women in Colleges and Universities* (Murch, 1991), along with a companion facilitator's manual (Joyce, 1991), for the purpose of conducting workshops on the chilly climate. The authors of these publications did not conduct empirical research, but rather provided a synopsis of the literature and made recommendations.

In the one review of literature on the chilly climate for women (Williams, 1990) which was found in the literature, the author actually focused only on gender bias in the classroom and concluded that there was a paucity of published research on gender-biased classroom practices in

the post-secondary classroom. Of the 20 references cited, only one referred to the chilly climate per se, and it was the original chilly climate report by Hall and Sandler (1982), which was not empirical research.

Over the past twenty years, empirical research on the chilly climate for women has yielded conflicting results. Some researchers have found evidence of a chilly campus climate for women (Janz & Pyke, 2000; Pascarella, Whitt, Edison, Nora, Hagedorn, Yeager, & Terenzini, 1997; Whitt, Nora, Edison, Terenzini, & Pascarella, 1999), but others have not (Constantinople, Cornelius, & Gray, 1988; Crawford & McLeod, 1990; Drew & Work, 1998; Heller, Puff, & Mills, 1985). While some researchers focused exclusively on the classroom environment (Constantinople et al., 1988; Crawford & McLeod, 1990; Heller et al., 1985), others have included the campus environment as well (Drew & Work, 1998; Janz & Pyke, 2000; Pascarella et al., 1997; Whitt et al., 1999). All research cited in the following sections of the literature review specifically stated the focus of the study was the chilly climate for women.

Research in Support of the Chilly Climate

There is empirical evidence that the chilly climate persists in postsecondary institutions. Pascarella et al. (1997) investigated how perceptions of a chilly campus climate affected the cognitive outcomes of women during their first year of college. A total of 23 institutions in 16 different states participated, including 18 four-year colleges and universities and 5 two-year institutions. Out of a target sample of 5,000 students, 3,840 participated. During the initial data collection in Fall 1992, students completed a pre-college survey and the Collegiate Assessment of Academic Proficiency (CAAP). The survey included items related to demographic characteristics and background, aspirations and college expectations, and orientation toward learning. The CAAP included three modules on reading comprehension, mathematics, and critical thinking. Follow-up

data were collected during Spring 1993. The CAAP was re-administered, along with the College Student Experiences Questionnaire (CSEQ) and a follow-up instrument which had been developed by the National Study of Student Learning (NSSL) to measure a wide range of both in-class and out-of-class experiences in the first year of college. Included in the NSSL instrument were eight Likert-scale items which together constituted the Perceived Chilly Climate for Women Scale (PCCWS). The PCCWS yielded scores with a mean of 26.98, a standard deviation of 5.48, and an internal consistency reliability of .81. Analysis of data was limited to the 1,636 women in the sample, which represented a population of the 18,129 female freshmen in the participating institutions.

Results at the two-year colleges (n=176) indicated that students' perceptions of a chilly climate had statistically significant negative associations with end-of-first-year cognitive development and self-reported gains in academic preparation for a career. At four-year colleges (n=1,460), the perception of a chilly climate had a statistically significant negative association only with self-reported gains in academic preparation for a career

To determine the impact of a perceived chilly climate on women's cognitive growth during the second and third years of college, Whitt et al. (1999) did a follow-up to Pascarella et al.'s (1999) study with the same women. The sample consisted of 1,078 sophomore women attending the 23 two-year and four-year institutions participating in the NSSL and 651 junior women attending the 18 four-year institutions. The sample represented populations of 13,017 second-year women and 12,557 third-year women at those institutions. The first follow-up data were collected in Spring 1993, including Form 88B CAAP reading comprehension, math, and critical thinking modules; the College Student Experiences Questionnaire (CSEQ); and a follow-up instrument developed for the NSSL to measure students' in-class and out-of-class experiences, including the 8-item PCCWS.

The second follow-up data collected in Spring 1994, including the CSEQ, the NSSL follow-up survey, and Form 88A CAAP writing and reading skills module.

In the second-year sample, two-year college women's perceptions of a chilly climate had statistically significant negative associations with three cognitive outcomes: self-reported gains in writing and thinking skills, understanding science, and understanding the arts and humanities. Two-year college women who perceived chilly campus climates reported significantly lower gains in these areas than peers who perceived a less chilly or not chilly climate for women. For four-year college women, perceptions of a chilly climate had statistically significant negative associations with four cognitive outcomes: self-reported gains in writing and thinking skills, understanding science, academic preparation for a career, and understanding arts and humanities. While self-reported gains in understanding self and others were also negatively correlated with perceptions of a chilly climate, the relationship was not statistically significant.

In the third-year sample, the perception of a chilly climate had a statistically significant negative effect on four self-reported cognitive outcomes including gains in writing and thinking skills, understanding science, academic preparation for a career, and understanding the arts and humanities. Surprisingly, there was a statistically significant positive effect of chilly climate on CAAP reading comprehension scores. While the perception of a chilly climate had a negative association with the CAAP critical thinking score, the correlation was not statistically significant. There were no statistically significant differences between two-year and four-year colleges in average scores on the PCCWS, after background characteristics were controlled for.

The relationship between perception of a chilly campus climate and various cognitive outcomes was clearly demonstrated in Whitt et al.'s study. The authors pointed out that the nature of the scale used to estimate perceptions of the chilly climate might explain the difference in two-year

and four-year students' experiences, as the PCCWS emphasizes gender discrimination in classroom settings more than non-classroom settings. As two-year college women tend to live off campus, they may view campus climate primarily as what occurs in class, so the scale described a comparatively large part of their college experience. Hence, choice of a scale to measure chilly climate is a consideration for future studies.

In order to study the existence of the chilly climate with a Canadian sample, Janz and Pyke (2000) developed the most comprehensive scale available to date to measure it. Initial items were generated based on Hall and Sandler's (1982) original definition of a chilly climate, which ensured face validity, and included aspects of classroom experiences, mentoring, curriculum, informal activities, peer interactions, safety, sexist behaviors, and sexual harassment. Additional items were derived from research in progress and from other scales designed to measure chilly climate. The result was a 123-item Preliminary Perceived Chilly Climate Scale (PPCCS). Responses were on a 7-point Likert scale, with additional options of "do not know" and "does not apply." The PPCCS was distributed to 416 graduate and 281 undergraduate students at a large Canadian university, and 202 were returned. Statistically significant differences were found between males and females, with females perceiving the academic climate to be chiller than males. Reliability as measured by Cronbach's alpha was .92.

In order to further assess the validity and reliability of scores on the instrument, the researchers then went through an extensive process to construct the final scale. Frequency distributions were run on each item, and items were deleted if less than 10% of the sample did not respond, or answered "do not know" or "does not apply." The variance of each item was examined, and preference was given to items with bimodal distributions. Items were retained if 15% responded at low and high ends. Internal consistency was measured by three procedures including inter-item

correlation, factor analysis, and calculation of Cronbach's alpha. Items with a minimum correlation of r = .3 with the total score were retained.

Factor analysis yielded five factors: climate students hear about, sexist treatment, climate students experience personally, classroom climate, and safety. Factor saliency was determined using a criterion of [.40]. Using Cronbach's alpha, internal consistency was measured for scores on the 55 items remaining. If deleting an item increased Cronbach's alpha, it was removed. The final version of the Perceived Chilly Climate Scale (PCCS) consisted of 28 items. The possible range of scores is 28 to 196, with a midpoint of 112. The higher the score, the chillier the student perceives the climate to be.

A second study was then conducted (Janz & Pyke, 2000). Questionnaire packets, including the PCCS, Alienation Scale, and the short form of the Marlow-Crowne Social Desirability Scale, were distributed to a sample of 488 undergraduate and graduate students. A total of 327 completed responses were returned (269 females, 57 males, 9 unspecified). Reliability of the PCCS scores as measured by Cronbach's alpha was .90. To further assess construct validity, scores on the PCCS were correlated with scores on Dean's Alienation Scale, a psychometrically sound scale that measures alienation, a theoretically related construct. A statistically significant positive relationship was found. As valid scores should not reflect socially desirable responding, scores on the PCCS were correlated with scores on the Marlow-Crowne Social Desirability Scale. No statistically significant relationship was found.

Janz and Pyke found that females perceived the climate to be chillier than males, with students who described themselves as feminists and students who had taken a course in women's studies also reporting a chillier climate than students who did not describe themselves as feminists and who had not enrolled in a women's studies course. Minority students perceived the climate to be

chillier than non-minority students and students who had been in school longer were more likely to perceive the climate as chilly. Although the sample was not random and the results of the study are not necessarily generalizable to students at other colleges, the value of this study is in the development of the instrument. The process used to create the Perceived Chilly Climate Scale and demonstrate the validity and reliability of its scores was systematic and thorough. Consequently, the scale will be of great value in future research.

Evidence Against the Chilly Climate

Although several authors investigating the chilly climate found no evidence of its existence (Constantinople et al., 1988; Crawford & McLeod, 1990; Drew & Work, 1998; Heller et al., 1985), these studies focused on specific aspects of the classroom environment. In an observational study of college classrooms, Constantinople et al. (1988) examined differences between male and female student participation and the effect of instructor gender on differences. The researchers hypothesized that gender of the instructor and gender of the student would influence patterns of interaction in the college classroom. A total of 168 students from 29 different departments at one college participated in the study. Courses observed were at the introductory (100) or intermediate (200) level from arts, social sciences, or natural sciences. Instructors had agreed to participate, but did not know if their courses were being observed. A total of 58 undergraduate students (47 females, 11 males) were trained as observers for courses in which they were enrolled. Observers completed a classroom map and a coding sheet of classroom interactions.

The researchers concluded that although their data did lend some support to the assertion that males are more active in the classroom than females, the effects of student gender on classroom participation are limited. There were stronger effects related to gender of the instructor, with

females inviting more participation than males. Class size did have an effect, as male instructors tended to teach larger classes in which there was less discussion. When class size was held constant, gender of the instructor was less important, and gender of the student was more a determinant of classroom behavior. When the number of males in a class was held constant, the effect of instructor gender on student behaviors was very limited. The most consistent factor in influencing both student and instructor behaviors was the type of curriculum, as natural science classes had more lecture, arts classes had more discussion, and social sciences were a combination of lecture and discussion.

Crawford and McLeod (1990) sought to assess students' perceptions of classroom climate via a survey and to empirically test two of Hall and Sandler's (1982) hypotheses: that women and men behave differently in the classroom, with women participating less frequently and less assertively; and that gender differences in classroom interaction can be at least partly attributed to teacher behaviors that discriminate against women. The first hypothesis was supported, but the second was not. Two separate studies were conducted, one with 627 undergraduates (347 females, 280 males) in 31 classes at a state university. A total of 15 classes were sampled at the 100 level; seven at the 200 level; seven at the 300 level; and two at the 400 level. The other study was at a small liberal arts college where 761 students (52% female) in 37 classes were surveyed. The instrument employed was an adaptation of the Student Perception Questionnaire (SPQ), a self-report measure of classroom interaction which assesses perceptions of both instructor and student behaviors. Validity or reliability information for scores on the SPQ was not provided.

Three aspects of classroom climate were studied: overall climate (what class is like for everybody), individual climate (what class is like for me), and teacher behaviors (what the teacher does in the class). Students were instructed to answer all questions about only this class and not

classes in general. Data were collected between the 10th and 13th weeks of a 15-week semester at the university and sometime during the last month of the semester at the small college.

Results at both sites indicated that class size was the variable most related to classroom participation. Findings indicated that all three aspects of climate studied were highly related to class size, overall climate was unrelated to teacher or student gender, and teacher behaviors were related to teacher gender, but not student gender. Overall, climate was significantly better in small classes. Women instructors were somewhat more likely to engage students in active participation, and men instructors were somewhat more likely to engage in negative behaviors such as offensive humor, but it was reportedly not directed more at women than men and had similar effects on both genders. Students did not believe that teachers of either gender discriminated against female students. Student participation was significantly affected by gender, with women less verbally engaged in class than men, which the authors interpreted as women being less assertive. Men perceived that they volunteered more often and were called on more often even when their hand was not raised. Men also reported that teachers responded more positively to their questions. Women were less confident in their intellectual abilities even though they had higher GPAs than men.

Drew and Work (1998) also found no evidence that women suffer from a chilly classroom climate in higher education. The researchers examined 15,960 student records (9,882 females, 6,078 males) from the College Student Experience Questionnaire (CSEQ, 3rd ed.) database. The class breakdown was 32% freshman, 24% sophomore, 14% junior, 28% senior, and 2% graduate. The CSEQ was selected as it had been used by over 300 colleges and universities to provide an index of student satisfaction with college and ratings of key characteristics of the college environment. This instrument has 8 college environment scales, 14 college activity scales to

measure student effort, and 23 estimate of gains scales. While the researchers reported that the CSEQ yielded highly reliable scores, validity and reliability information was not provided.

Results indicated that females reported interacting more in class with faculty and participating more frequently in class than males, and they also assessed their relationships with faculty and other students more positively than men. On the other hand, female students did not interact with faculty as frequently as males did after class, and interacted less frequently with faculty than males on research projects. Overall, the authors concluded that there was no evidence in their study that women are suffering from a chilly classroom climate. However, it was noted that male students reported higher gains than female students in science, technology, and quantitative skills areas; differences which were small, but meaningful. As these differences could be due to differences in programs of study, further research in this area was recommended.

The stated purpose of the chilly climate study by Heller et al. (1985) was to give women an opportunity to anonymously indicate the extent to which they perceived that faculty engaged in any of the behaviors described in Hall and Sandler's (1982) original report. The sample consisted of 429 undergraduate students (216 females, 213 males) who volunteered to participate, including 127 freshmen, 152 sophomores, 85 juniors, and 65 seniors. Students in introductory and advanced courses in psychology, economics, and classics were asked to complete a survey. The authors used Hall and Sandler's report to design a survey, which included questions about faculty behaviors, students' confidence, the type of questions faculty asked students, and student's perceptions of themselves and their education. No data on validity or reliability for scores on the instrument were provided.

Results indicated no differences between men and women in any of the faculty behaviors identified by Hall and Sandler (1982) as contributing to the chilly academic climate. The only

statistically significant difference was found in the opposite direction, that women perceived less faculty use of sexual humor than men did. While there were no statistically significant differences in students' confidence overall, when results were broken out by class, freshman males were significantly more confident in their academic ability than females. Confidence did increase significantly for women between the freshman and senior years. At the freshman level was there was a statistically significant difference in women's and men's confidence in math, as women (48.9%) indicated they lacked math skills with much greater frequency than men (22.0%).

There was a statistically significant difference between the extent to which men and women agreed with the statement, "I lack skills in argumentation." Overall, 27.2% of women agreed, while only 14.7% of men agreed. Males indicated that they were asked more lower-level factual questions than females, who were asked more higher-level analytical questions.

Several shortcomings of these studies are noteworthy. First, all four of the studies which reportedly provided evidence against the chilly climate were, in fact, studies of classroom interactions, and classroom climate is not equivalent to campus climate. Questions about sexual harassment are essential to the assessment of a chilly climate, but were deliberately excluded from the studies by Crawford and McLeod (1990) and Drew and Work (1998), and were not an issue in the observational study by Constantinople et al. (1988). A variety of instruments were used to assess classroom climate, about which no validity or reliability data were provided. In the study by Crawford and McLeod (1990), data were collected late in the semester, presumably past the deadline to drop classes. Consequently, students who had perceived classroom gender bias may have dropped classes and would not have been included in the sample. Further, the samples consisted of more freshman and sophomore students than juniors, seniors, or graduate students,

and research has demonstrated that students who have been in school longer are more aware of gender bias (Janz & Pyke, 2000).

While these studies did find that women participated less than men, the question of why women participate less remains to be answered. Perhaps more subtle expressions of gender bias had an effect, for example, lack of instructor eye contact or responding with more interest to the comments of males than females. Such subtle discrimination may not be openly recognized, but may be sensed by female students.

Conclusions and Recommendations

Empirical research has documented the existence of the chilly climate for women pursuing higher education. The perception of a chilly climate has been found to negatively affect cognitive gains of women attending both 2-year and 4-year colleges (Pascarella et al., 1997). Further, women have been found to perceive the climate to be chillier than men, minorities perceived the climate to be chillier than non-minorities, and students who had been in school longer perceived the climate to be chillier than other students (Janz & Pyke, 2000). Studies claiming to refute the existence of the chilly climate have focused only on the classroom climate rather than the campus climate as a whole (Constantinople et al., 1988; Crawford & McLeod, 1990; Drew & Work, 1998; Heller et al., 1985). While these studies did document that women participated in class less than men, they did not explain this phenomenon.

Of the few empirical studies conducted on the chilly climate, most focused exclusively on the classroom environment. As the chilly climate extends beyond the scope of the college classroom, it is recommended that future studies be conducted on the chilly college environment as a whole. It is further recommended that future researchers utilize an instrument, such as the Perceived Chilly Climate Scale (Janz and Pyke, 2000), that has been demonstrated to be valid and reliable.

Studies on the chilly climate for women in non-traditional majors and how perceptions of a chilly climate correlate with retention in such majors would be of particular interest.

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Chilly Climate Materials

The Chilly Climate Series:

The Program for the Status and Education of Women of the Association of American Colleges and Universities published a series of reports on the chilly climate which is available today as the "Chilly Climate Series" (Association of American Colleges and Universities, 2003). It is available at a cost of $24 at: www.aacu.org or by calling 1-800-297-3775. The series includes:

- Hall, R. M., & Sandler, B. R. (1982). *The Classroom Climate: A Chilly One for Women?*
- Hall, R. M., & Sandler, B. R. (1983). *Academic Mentoring for Women Students and Faculty: A New Look at an Old Way to Get Ahead*
- Hall, R. M., & Sandler, B. R. (1984). *Out of the Classroom: A Chilly Campus Climate for Women?*
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- Sandler, B. R., & Hall, R. M. (1986). *The Campus Climate Revisited: Chilly for Women Faculty, Administrators, and Graduate Students*
- Ehrhart, J. K., & Sandler, B. R. (1990). *Rx for Success: Improving the Climate for Women in Medical Schools and Teaching Hospitals*
- Sandler, B. R. (1992). *Success and Survival Strategies for Women Faculty Members*
- Sandler, B. R., & Hoffman, E. (1992). *Teaching Faculty Members to be Better Teachers: A Guide to Equitable and Effective Classroom Techniques*

The Chilly Climate Video:

In Canada, the University of Western Ontario's Caucus on Women's Issues produced a video, *The Chilly Climate for Women in Colleges and Universities* (Murch, 1991), along with a companion facilitator's manual, *The Chilly Climate for Women in Colleges and Universities: Warming the Environment* (Joyce, 1991), for the purpose of conducting workshops on the chilly climate. The video and facilitator's manual are available at a cost of $52 from Western's Caucus on Women's Issues, University of Western Ontario, 1137 Western Road, London, Ontario, Canada N6G 1G7, tisaacs@uwo.ca.

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